THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte KENNETH C. SCOTT,
MATTHEW C. YEATES,
DAVID S. KAGELS,
and STEPHEN H. WATSON

_____

Appeal No. 1997-3225
Application 08/351,218

_____

ON BRIEF

_____

Before HAIRSTON, FLEMING, and LALL, **Administrative Patent Judges**.

FLEMING, **Administrative Patent Judge**.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1 through 7, 9, 11 through 37, 41 through 52, 54, 56

through 72 and 79 through 84. Claims 8, 10, 38 through 40, 53, 55 and 73 through 78 were canceled.

The invention relates to a technique for allowing a computer to simulate an animated image of a human speaking. As identified in the specification on pages 9 and 10, a spoken language is broken down into units of speech, phonemes and diphthongs. Then as identified on page 10 of the specification, a video of a person speaking is obtained and individual frames which best represent the person using these units of speech are determined. As identified on pages 11 through 14 of the specification, these frames are then saved in a database, each image corresponding to a phoneme. As described on pages 14 and 15 of the specification, features in each image in the database are matched to identical features in the other images. These features in the images are called tiepoints. As identified on page 15 of the specification, an audio speech sequence to be synchronized with the images is then analyzed to determine spoken phonemes and their relative timing. Then as identified on pages 15 through 18 and 32

through 34 of the specification, a visual image of the speaker is simulated. The database is then used to provide images which correspond to the spoken phonemes. Morphing is then performed on these images to provide transition images. The database images and morphed images are used to provide the animated image. As described on page 34 of the specification, the tiepoints are used to control the degree of movement of characteristics in the images as they are animated.

Independent claim 6 is reproduced as follows:

6. A method of producing a computer-based animation of a subject speaking, comprising:

determining a set of units of speech;

preparing a database of images, each said image corresponding to one of said units of speech;

establishing some aspect of each image of said database which relates to each other image in the database;

obtaining a sequence of speech to which said animation is to be synchronized;

analyzing said sequence of speech to determine said units of speech therein;

determining keyframe images which correspond to said units determined by said analyzing; and

using said keyframe images to produce said animation sequence by defining relationships among the aspects in a way that maintains at least one of said aspects in a predetermined relationship with another of said aspects.

The Examiner relies upon the following references

S. Lee et al. (Lee), “Image Morphing Using Deformable Surfaces,” 31-39 (1994).

F. Lavagetto et al.(Lavagetto), “Lipreadable Frame Animation Driven by Speech Parameters,” International Symposium on Speech, Image Processing and Neural Networks, 626-629 (April 13-16, 1994).

D. Terzopoulos et al. (Terzopoulos), “Analysis and Synthesis of Facial Image Sequences Using Physical and Anatomical Models,” IEEE Transactions on Pattern and Machine Intelligence, Vol 15, no. 6, 596-579 (June 1993).

Claims 1 and 4 stand rejected under 35 U.S.C. § 103 as being unpatentable over Lee. Claims 2, 3, 5, 6, 7, 9, 16, 24, 83 and 84 stand rejected under 35 U.S.C. § 103 as being unpatentable over Lee and Lavagetto. Claims 11 through 15, 17 through 23, 25 through 37, 41 through 52, 54, 56 through 72 and 79 through 82 stand rejected under 35 U.S.C. § 103 as being unpatentable over Lee, Lavagetto and Terzopoulos.

Rather then reiterate the arguments of Appellants and the Examiner, reference is made to the brief and answer for the respective details thereof.

Opinion

After careful review of the evidence before us, we agree with the Examiner's rejection of claims 1, 4, 5, 83 and 84 under 35 U.S.C. § 103. However, we disagree with the Examiner's rejection of claims 2, 3, 6, 7, 9, 11 through 37, 41 through 52, 54, 56 through 72 and 79 through 82 under 35 U.S.C. § 103.

At the outset we note that Appellants state on page 3 of the brief that claim 5 rises and falls with claim 4. Further, it is noted that Appellants state that claims 1, 4, 83 and 84 do not rise or fall together. 37 C.F.R. § 1.192(c)(7)(July 1, 1995) **as amended at** 60 Fed. Reg. 14518 (March 17, 1995), which was controlling at the time of Appellants' filing the brief, states:

> For each ground of rejection which appellant contests and which applies to a group of two or more claims, the Board shall select a single claim from the group and shall decide the appeal as to the ground of rejection on the basis of that claim alone unless a statement is included that the claims of the group do not stand or fall together and, in the argument under paragraph (c)(8) of this section, appellant explains why the claims of the group are believed to be separately patentable. Merely pointing out differences in what the claims cover is not an argument as to why the claims are separately patentable.

Although Appellants have provided a statement that the claims do not stand or fall together, Appellants have not in the arguments section of the brief explained why the claims are believed to be separately patentable. Specifically the Appellants have not shown why claim 4 is separately patentable over claim 1 or why claim 84 is separately patentable over claim 83. Accordingly, for the rejection under 35 U.S.C. § 103 based upon Lee, we will group claims 1, 4 and 5 and we will treat claim 1 as representative of that group. For the rejection under 35 U.S.C. § 103 based upon Lee and Lavagetto, we will group claims 83 and 84 with claim 83 as a representative claim of the group.

We first consider the rejection of claims 1 and 4 under 35 U.S.C. § 103 as being unpatentable over Lee.

It is the burden of the Examiner to establish why one having ordinary skill in the art would have been led to the claimed invention by the express teachings or suggestions found in the prior art or by the implications contained in such teachings or suggestions. ***In re Sernaker***, 702 F.2d

989,995, 217 USPQ 1, 6 (Fed. Cir. 1983). “Additionally, when determining obviousness, the claimed invention should be considered as a whole; there is no legally recognizable ‘heart’ of the invention." ***Para-Ordance Mfg. V SGS Importers Int’l Inc.***, 73 F3d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995)(***citing W. L. Gore & Asscs., Inc.v. Garlock Inc***., 721 F.2d 1540, 1548, 220 USPQ 303, 309 (Fed. Cir. 1983), ***Cert. denied***, 469 U.S. 851 (1984)).

Appellants assert on page 6, line 2, of the brief that the present invention adopts a database of images approach to provide images for animation. Appellants argue that Lee does not teach the limitation in claim 1 of “forming a database of images including at least said first and second images.”

In analyzing the scope of the claim, office personnel must rely on the Appellants' disclosure to properly determine the meaning of terms used in the claims. ***Markman v. Westview Instruments***, 52 F.3d 967, 980, 34 USPQ2d 1321, 1330 (Fed. Cir.)
(in banc), ***aff'd***, U.S., 116 S. Ct. 1384 (1996).

We note that claim 1 only requires a database containing two images. In determining the scope of the term “database”, we look to the Appellants’ specification. Appellants’ specification on page 11, lines 2 and 3, identifies that the images are captured, numbered and stored to form a database. We fail to find a different definition of “database” than the ordinary meaning of storing data. Thus we conclude that the scope of the “forming a database of images including at least said first and second image” limitation of claim 1 is that there are two images stored in a computer’s memory. We find that Lee teaches that two images are stored on a workstation and as such the two images are stored in a computer memory. Accordingly we find that Lee’s teaching of storing two images in computer memory meets the above claim 1 limitation.

Appellants further assert on page 6 of the brief that Lee teaches away from storing images in a database as Lee calculates the images each time a morphing is to be performed.

As previously identified the scope of Appellants' claim 1 includes a database containing at least two images. While it is appreciated that Appellants' database of images approach

is different than Lee's approach, Appellants' claim 1 does not distinguish Appellants' approach from Lee's approach.

Finally, in the paragraph bridging pages 6 and 7 of the brief, Appellants argue that even if Lee were to be construed as containing a database, Lee does not teach "maintaining a specified relationship between said aspects." We find that Lee teaches on page 35, section 3.2, "[t]he set S represents the feature correspondence between" the two images. We find that Lee's set S meets Appellants' "aspects." Further, on page 35 section 3.2, Lee teaches that the warp function maps the points from one image to the second. We find that Lee's warp function performs Appellants' claimed "maintaining a specified relationship between said aspects."

For the foregoing reasons we affirm the Examiner's rejection of Claims 1, 4 and 5 under 35 U.S.C. § 103 as being unpatentable over Lee.

We next turn to the rejection of claims 83 and 84[1] under 35 U.S.C. § 103 as being unpatentable over Lee and Lavagetto.

On page 12 of the brief, Appellants argue that "[c]laim 83 recites that the aspects are tiepoints" and " [n]othing in the references teaches or suggests tiepoints." Appellants assert on page 12 of the brief that tiepoints are a useful part of the invention as they avoid having the head bobbing which would otherwise occur in the animation.

Claim 83 adds to claim 1 the limitation "wherein the aspects are tiepoints." As we have previously held Lee's set of points S are considered to meet the claimed "aspects." Also, as we have previously stated Lee's warp function maps these points from one image to the next, and as such the points smoothly transition

[1] The scope claim 84 as presented cannot be determined as the limitation "said processor" lacks antecedent basis. However, we do not need to determine the scope of claim 84 as claim 84 falls with claim 83.

from one image to the next. Further, we note Appellants' following statement on page 11, lines 7 through 11:

> However, the tiepointing system in Lee is done from the point of view of a surface morphing technique. Nothing in Lee teaches or suggests determining tiepoints in each image "which are associated with similar tiepoints in other images in the database."

This statement suggests that Appellants recognize that Lee teaches tiepoints, but differentiates claim 83 based upon the database distinction argued with respect to claim 1. Therefore, we find that Lee's set of points S meets Appellants' claimed "tiepoints."

We next turn to claims 2, 3, 6, 7, 9, 16 and 24, which stand rejected under 35 U.S.C. § 103 as being unpatentable over Lee and Lavagetto. After considering the record before us we find that the teachings of Lee and Lavagetto in combination do not teach or make obvious the invention of claims 2, 3, 6, 7 9, 16 and 24.

Appellants' arguments directed to claim 6, on page 8 of the brief, reiterate the inapplicability of Lee to the database of images approach claimed. Further, Appellants assert that Lavagetto does not make up for the failure of Lee to teach a database of images. Finally, on pages 9 and 10 of the brief, Appellants argue that Lavagetto does not teach "establishing some aspect of each image of the database which relates to another image."

In determining the scope of claim 6, we find that claim 6 does draw a distinction between Appellants database approach and Lee's approach. Claim 6 contains the limitations of "preparing a database of images, each image corresponding to one of said units of speech." Claim 6 also calls for "establishing some aspect of each image of said database which relates to each other image in the data base." We find the scope of claim 6 to include that the database contains many images and performs the function of corresponding units of speech to images. Further, the scope of claim 6 is that all of the images in the database have aspects established which relate to aspects in all of the other images. This scope is

different than we found for claim 1 in several ways, the database includes more images and provides for correlation functions, further the aspects are determined for all of the images in the database.

We find that the Examiner has failed to present a ***prima facie*** case of obviousness. We find that the database teaching of Lee is limited to two images. Lee does not teach that the images are in a database where the images correspond to a unit of speech. Further, Lee does not teach determining aspects for more than the two images being animated. We find that Lavagetto on page 628, column 1, teaches a "database of images (key-pictures) reproducing the mouth expressions associated to the pronunciation of each classified phoneme." However, we find that Lavagetto does not teach determining aspects of each image which are common to other images in the database. We find that the Examiner has failed to show that each limitation in the claim is taught by the prior art. Specifically, the prior art does not show "establishing some aspect of each image of said database which relates to each other image in the database," where said database is "a database of images,

each image corresponding to one of said units of speech." Further we find that the Examiner has not shown that the prior art suggests any reason to modify Lee to include "a database of images, each image corresponding to one of said units of speech," and to establish "some aspect of each image of said database which relates to each other image in the database."

For the foregoing reasons we will not sustain the rejection of claim 6 under 35 U.S.C. § 103 as being unpatentable over Lee and Lavagetto. Claims 7, 9, 16 and 24 all depend upon claim 6, accordingly, the rejection of these claims will not be sustained. Similarly we will not sustain the rejection of claims 11 through 15, 17 through 23 and 25 through 34[2] under 35 U.S.C. § 103 as being unpatentable over Lee, Lavagetto and Terzopoulos as these claims are all ultimately dependent upon claim 6.

Turning to claim 2, we find that dependent claim 2 contains the limitation "said first and second and other

[2] The scope of claim 26 as presented cannot be determined as the limitation "said keypoint" lacks antecedent basis.

images in said database corresponding to said different units of speech" which in conjunction with independent claim 1, has similar scope to those limitations of claim 6 addressed above. Accordingly, we will not sustain the rejection of claims 2 and 3 (which depends upon claim 2).

Finally, we turn to the rejection of claims 35 through 37, 41 through 52, 54, 56 through 72 and 79 through 82 as being unpatentable over Lee, Lavagetto and Terzopoulos.

On page 13 of the brief, Appellants argue that the combination of references is improper and that Terzopoulos is inapplicable to the claimed invention. Appellants assert that Lavagetto is a system which makes use of animating key frames and that Terzopoulos is a modeling system of animation and "this combination would not be made by a person having ordinary skill in the art."

In determining whether prior art is properly combinable the Federal Circuit reasons in **Para-ordnance Mfg. Inc. v. SGS Importers Int'l Inc.,** 73 F.3d 1085, 1088-89, 37 USPQ2d 1237, 1239-40 (Fed. Cir. 1995), **cert. denied,** 519 U.S. 822 (1996),

that for the determination of obviousness, the court must answer whether one of ordinary skill in the art who sets out to solve the problem and who had before him in his workshop the prior art, would have been reasonably expected to use the solution that is claimed by Appellants.

At the outset, it is noted that neither the Appellants nor the Examiner have addressed any of the limitations in independent claims 35, 41, 44, 48, 58, 59, 69, 70 or 79. Accordingly, we will look to the rational provided in the rejection of other claims to determine if the art is properly combinable. On page 11 of the answer, the Examiner asserts that Terzopoulos on page 577, paragraph 2 teaches the limitations concerning “obtaining samples of the subject speaking; investigating the sample to identify the units therein.” Further on page 12 of the answer, the Examiner relies upon Terzopoulos to teach the limitations “wherein said images are of a user’s head and face,” and “changing an amount of lighting effect.”

Lee concerns a system were existing images are used in combination with modified images to produce an animated result. Lavagetto teaches animation using either a series of existing images or a modeling technique. Lavagetto's teachings relevant to the claims deal with using existing images to produce an animation. Terzopoulos is concerned with generating an animation

by using computer modeling techniques to generate an image. Reviewing Terzopoulos, pages 576 and 577, section E. we find that the use of video frames of a subject is to generate data for input to a synthesized model of the subject. The problem to be solved by Appellants' invention concerns animating images, specifically obtaining images to be used in the animation. We find that one of ordinary skill in the art would not look to Terzopoulos's teaching of adjusting a synthesized model based upon video of observed behavior, for a teaching that video of a subject should be analyzed to obtain images for animation. Accordingly, we conclude that Terzopoulos was inappropriately combined with Lee and Lavagetto.

We next consider the scope of each of the independent claims.

Claims 35, 41, 44, 58, 59, and 70 are all independent claims which contain limitations similar in scope to those of claim 6 mentioned above. For example, representative claim 35 contains the limitation "determining some aspect of each image . . . to

the same aspect in another image in the database," where the database is "a database of images . . . corresponds to a unit part of said action." As we have found that Terzopoulos is not properly combined with Lee and Lavagetto, the reasons set forth above with respect to claim 6 also apply. Accordingly, we will not sustain the rejection of claims 35 through 37, 41 through 47, 58 through 62, 66, 70, 71 and 72.

Claims 48 and 79 are independent claims and contain limitations of analyzing a video sample to determine an image which best represents a unit of speech and saving it in a database. Specifically, claim 48 contains the limitations of "obtaining a sample of the subject speaking," "determining a part of the sample which best represents a particular unit" of speech and "storing an image in the database representative of said part of the sample which best represents the particular unit and an indication of the particular unit." We find that the feature of

analyzing a video sample to determine images which best represent the unit of speech and saving it is not taught by either Lee or Lavagetto. Further as addressed above Terzopoulos is not combinable with Lee or Lavagetto for these features. Accordingly, we will not sustain the rejection of claims 48 through 57, 63, 64, 65 67, 68 and 79 through 82.

Finally, we turn to claim 69 which contains the limitations "to determine keyframe images which correspond to said units of speech . . . wherein each keyframe image is defined by two images, said two images include a first image with a first weighting, and a second image with a second weighting, said weighting amounts defining an amount of transparency relative to each other." We find that neither Lee nor Lavagetto teaches or makes obvious the use of two images for each unit of speech, where one image is transparent relative to the other. Accordingly, we will not sustain the rejection of claim 69.

In view of the foregoing, we affirm the rejection of claims 1, 4, 5, 83 and 84 under 35 U.S.C. § 103. We reverse the rejection of claims 2, 3, 6, 7, 9, 11 through 37, 41

through 52, 54, 56 through 72 and 79 through 82 under 35 U.S.C. § 103.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)

AFFIRMED-IN-PART, REVERSED-IN-PART

KENNETH W. HAIRSTON Administrative Patent Judge	)	
MICHAEL R. FLEMING Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
PARSHOTAM S. LALL Administrative Patent Judge	)	

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